Applicant's Summary for Telephone Contact 10/13/04

Applicant took the position that a "cable' and a "wire" are distinct entities and the industry recognizes this distinction. In support applicant presented the following:

I) "Cable" is defined as " Group of two or more insulated wires covered with an outer sheath (jacket) overall".

"Wire" as " a single solid or stranded group of conductors having a low resistance to current flow"

"Insulated" as a" non-conducting material used to isolate conducting material from one another".

II) Applicant, an expert with 30 yrs. experience in W&C , in his application had made the clear distinction between cable and wire (see claim 18 (cable) and claim 26 (wire).

III) Kikuchi in 6,248,446 always references his invention as a covered (insulated) wire and never uses cable to describe his invention.

IV) Industry refers to the area as Wire **and** Cable.

Examiner did not consider these points persuasive and held that the art makes no distinction between "wires" and "cables"

Brief Review of Key Features of Invention

Specific to Sheath (Jacket) Application- New Claim 35

The metal hydrate- polyolefin based FR system is the predominant non-halogen wire and cable FR technology. In his application applicant theorized that as the cable temperature is raised this type FR system is significantly compromised for its effectiveness. Two applications targeted by applicant for his dual layer sheath technology, namely, plenum and riser cable, expose the test cables to very large flame sources and for prolonged times (UL 910 and UL 1666, respectively). In addition plenum cable testing is performed in an insulated tunnel. During testing, cable constructions rapidly reach high temperatures. Metal hydrate FR is all but lost and cable failure from rapid flame spread occurs.

Applicant has developed a novel construction whereby the efficacy of metal hydrate FR is retained even under the most severe fire conditions. The approach involves employing in separate layers two otherwise antagonistic FR systems to defeat this antagonism. Quite unexpectedly the approach produces a synergism that vastly improves the performance of the metal hydrate system under both plenum and riser test conditions.

Two reasons account for the failure of others skilled in the art for not seeing applicant's invention:

- Failure to recognize and understand the substantial effect that cable heat up has on a metal hydrate (endothermic) FR system.

- Knowledge that metal hydrate FR and intumescent FR are extremely antagonistic and that this combination renders both useless in FR application.

Applicant submits the above show his invention to be novel and not obvious.

Specific to Insulation Application- New Claim 43

Applicant's use of the technology as an insulating material, claims 43-51, adds an additional unrecognized dimension. Herein applicant formulates the inner layer with a strong base, magnesium or calcium hydroxide, to neutralize and defeat the conductor corrosion that would otherwise occur from the hydrolysis of the phosphorous components in the outer intumescent layer. The generation of strong acid and the resulting conductor corrosion stands as the primary reason for intumescent FR technology not being used as wire insulating materials.

Applicant submits his invention provides outstanding thermal and fire protection and solves the long standing problem that bars the use of phosphorous-based intumescents for flame retarding wire insulants.

Rejection of Claims 18-22 Under U.S.C. 103(a)

The O.A. rejected claims 18-22 under U.S.C. 103(a) as being unpatentable over Kikuchi et al. (6,248,446) in view of Fishler et al. (4,404,297).

Kikuchi et al. teaches a conductor coated with a cover consisting of a flame retarded first (inner) layer and a second layer, not containing inorganic fillers or flame retardants, for providing mechanical and chemical protection. Kikuchi focuses on two key features:

- limiting thickness in order to lightweight his construction to be competitive with an existing PVC construction

- the outer layer should not contain filler or flame retardants in order to preserve the function for providing mechanical and chemical protection.

Applicant has rewritten claim 18, now claim 35, to reflect his invention as a sheath component of a cable construction to distinguish it from Kikuchi's insulating wire cover.

Examiner notes Kikuchi does not include an intumescent in his outer layer but cites an intumescent system by Fishler et al. as a technology that one skilled in the art would include. Applicant does not see justification for the suggested combination. Kikuchi faced with optimizing flame retardance never attempts to formulate his outer layer to meet need. His focus is on controlling the thickness of the outer layer (Table 3, examples 2 & 5 vs. 1,3,4 &6). Kikuchi limits fuel (resin) by thinning his outer layer and the total construction.

Moreover Kikuchi limits his inner layer thinness to 30 microns. With a wire construction of this nature a primary source of "Kikuchi's flame retardance" becomes the heat sink effect of the metal conductor. In the main Kikuchi's approach to flame retardance leads away from applicant's approach.

Kikuchi avoids adding flame retardants to his outer layer out of his stated concern for loss of the mechanical and chemical properties provided by this layer. Throughout his patent Kikuchi states that his outer layer should not contain inorganic fillers or flame retardants. Examiner made the suggestion to combine Fishler with Kikuchi.

Fishler's intumescent system is based on combinations of numerous acids, fillers and complex salts. These extremely polar and polymer incompatible materials represent the class of material Kikuchi seeks to avoid. Moreover Fishler's methodology of thermolyzing mixtures of his additives, such as directed in Example 2, leads to the formation of additional complex salts. Melamine phosphate and triethanolamine under the stated thermolysis conditions will decompose to yield numerous by-products including ammonia and phosphoroic acids. These will convert to inorganic salts such as ammonium phosphate and polyphosphates. The oxides of nitrogen, also produced from said additives, would similarly react to produce ammonium salts. (See attached MSDS's).Adding the highly polar inorganics of Fishler, such as phosphorous pentoxide, phosphorous acids and salts, amine phosphates and the like, is exactly what Kikuchi seeks to avoid in order to retain the mechanical and chemical properties of his outer layer.

For the reasons above the rejection of claim 18, now rewritten as claim 35, is overcome. Claims 36-42, now directly or indirectly dependent on the rewritten claim 35, are similarly deemed patentable.

Rejection of Claims 25-34 Under U.S.C. 103(a)

The O.A. rejected claims 25-34 under U.S.C. 103(a) as being unpatentable over Kikuchi et al. in view of Fishler et al. Applicant has rewritten the independent claim 26, now claim 43, for application of his invention as a flame retarded, corrosion resistant insulating material.

Kikuchi teaches an insulating dual layer cover for a conducting wire. His focus is on fashioning a very limited cover thickness, < 400 microns, preferably about 300 microns, required to match the thinness of the established PVC insulant. Applicant's independent claim for an insulating material, claim 26, now rewritten as claim 43, is directed to thicknesses far in excess of Kikuchi's. Certain of the wire constructions targeted for applicant's invention, namely, THHN/THHW building wire and primary automotive wire are specified to require thicknesses in the range of about 15-45 mils. These specifications exceed Kikuchi by 50-150 times.

Examiner refers to a modified cable of Kikuchi as meeting the claims of applicant's invention. Applicant's rewritten claim 43 overcomes this assertion. Kikuchi's thickness limitations and his exclusion of inorganics from his outer layer leaves no room for comparision to applicant's construction.

Finally, applicant will address his invention for its novel breakthrough corrosion resistant intumescent FR technology. As previously discussed phosphorous-based intumescent FR systems are avoided as a wire insulating material due to the extensive conductor corrosion from the hydrolysis of the intumescent. The thinness of Kikuchi's construction, inner layer 30 microns, would prohibit its functioning over the lifetime of the wire as a barrier against the corrosive acids. Applicant's invention is an elegant solution for the long standing problem of conductor corrosion. Moreover protection is accomplished without introducing any cost or complexity in formulation or processing. Applicant submits that this simplicity does not necessarily mean obvious. The corrosivity of intumescents towards metal conductors was known and long recognized but no solution was advanced prior to applicant's.

For the reasons above the rejection of claim 26, now rewritten as claim 43, is overcome. Rewritten claims 44-49, now directly or indirectly dependent on claim 43, are simiarly deemed patentable.

New claims 50 and 51 are uses for the construction claimed in 43 and are patentable.

Rejection of Claims 23 and 24 Under U.S.C. 103(a)

The O.A. rejected claims 23 and 24 under U.S.C. 103(a) as being unpatentable under Kikuchi in view of Fishler and further in view of Keough et al.

Kikuchi established sufficient flame retardance through limiting the thickness of his construction, Tables 2 and 3. No need exists for an additional degree of flame resistance and hence to consider Keough et al. would be unwarranted. Moreover the material described in Keough et al. is targeted for application as a cable sheath or jacket. The extreme polarity of the base resin and the fillers employed would not provide the electrical properties sought for an insulation particularily at the thicknesses taught by Kikuchi. In fact filler particle size approaches coating thickness. As such Keough et al. would not be considered suitable for Kikuchi insulation.

In applicant's submittal claims 23 and 24, now rewritten as 40 and 41, differ substantially because they are directed to a sheath application where electrical properties become relatively unimportant.

Conclusion

For all of the reasons above, applicant submits the specification and claims are now

in proper form and that the claims all define patentability over the prior art. Therefore he submits that this application is now in condition for allowance, which action is respectfully solicited.

Conditional Request for Constructive Assistance

Applicant has amended the claims of this application so that they are proper, definite, and define novel and unobvious matter. If, for any reason this application is not believed to be in full condition for allowance, applicant respectfully requests the constructive assistance and suggestions of the Examiner pursuant to M.P.E.P. 707.07(j) in order that the undersigned can place this application in allowable condition as soon as possible and without the need for further proceedings.

Very Respectfully,

Michael John Keogh

19 Abington Drive
Pinehurst, NC 28374
Tel. # 910 215-8980

Certificate of Mailing: I certify that this correspondence, and attachment, if any, will be deposited with the United States Postal Service by first class mail, postage paid, in an envelope addressed to Mail Stop RCE, Commissioner for Patents, P. O. Box 1450, Alexandria, Va 22313-1450 on the date below.

Date: November 15, 2004
Inventor's Signature :

MSDS SHEET

Melamine Phosphate

Section I. Chemical Product and Company Identification

Supplier:

Hummel Croton Inc.
10 Harmich Road
South Plainfield, NJ 07080
(908)-754-1800

Health	1
Flammability	0
Reactivity	0
Personal Protection	E

Chemical Name: Melamine Phosphate
Synonym: Melamine Phosphate 1:1, Melamine Orthophosphate
CAS Number: 20208-95-1
Chemical Formula: $C_3H_9N_6PO_4$

In case of Emergency Call Chemtrec ®
(800)-424-9300(U.S.)
(703)-527-3887 (international)

Section II. Composition and Information on Ingredients

Chemical Name	*CAS #*	*Percent*	*OSHA*	*ACGIH*
Melamine Phosphate	20208-95-1	100%	Not Established	Not Established

Since no Exposure limits have been established for Melamine Phosphate by OSHA & ACGIH, we recommend that our product should be treated as a nuisance dust 15 mg/m^3 .

Section III Identification:

Acute Health Effects: Irritating to the skin and eyes on contact. Inhalation will cause irritation to the lungs and mucus membrane. Irritation to the eyes will cause watering and redness. Reddening, scaling, and itching are characteristics of skin inflammation. Follow safe industrial hygiene practices and always wear protective equipment when handling this compound.
Chronic Health Effects: This product has no known chronic effects. Repeated or prolong exposure to this compound is not known to aggravate medical conditions.
Acute Health Effects: This product is not listed by NTP, IARC or regulated as a Carcinogen by OSHA.

Section IV. First Aid Measures

First Aid For Eye: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.
First Aid For Skin: In case of contact, flush skin with water. Wash clothing before reuse. Call a physician if irritation occurs.
First Aid For Inhalation: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.
First Aid For Ingestion: If swallowed, call a physician immediately.

Section V. Fire and Explosion Data

Flammability: Non-Flamable
Flash Points: Not Applicable
Auto-Ignition: Not Applicable
Flammable Limits: Not Applicable
Extinguishing Media: Water, Carbon Dioxide or Dry Chemical Foam
Fire Fighting Procedure: Wear self-contained, positive pressure breathing apparatus.
Fire/Explosion Hazards: As with many solids, any dust that is generated may be explosive if mixed with air in critical proportions and in the presence of a source of ignition.

Section VI. Accidental Release Measures

Spill Or Leak Procedures: Utilize recommended protective clothing and equipment. Clean spills in a manner that does not disperse dust into the air. Spill area can be washed with water. Collect wash water for approved disposal. Keep from entering water or ground water

Section VII. Handling and Storage

Storage Temperatures: Store at ambient temperature
Shelf Life: Unlimited in tightly closed container.
Special Sensitivity: None
Handling/Storage Precautions: Avoid breathing dust. Avoid getting in eyes or on skin. Wash thoroughly after handling. Store in a dry place away from direct sunlight, heat and incompatible materials (see Section X). Reseal containers immediately after use. Store away from food and beverages.

Section VIII. Exposure Controls/Personal Protection

Eye Protection: Safety glasses or goggles.
Skin Protection: PVC gloves with impervious boots, apron or coveralls. Employees should wash their hands and face before eating, drinking or using tobacco products.
Respirator: Work ambient concentrations should be monitored and if the recommended exposure limit is exceeded, a NIOSH/MSHA approved dust respirator must be worn.
Ventilation: Use local ventilation if dusting is a problem, to maintain air levels below the recommended exposure limit.
Additional Protective Measures: Emergency showers and eye wash stations should be available. Educate and train employees in the safe use and handling of hazardous chemicals.

Section IX. Physical and Chemical Properties

Physical Form: Fine Crystalline Powder
Color: White
Odor: Odorless
Molecular Weight: 224.12
Boiling Point: Decomposes ~300°C
Melting/Freezing Point: Decomposes ~300°C
Solubility in Water: ~0.7g/100ml at ambient temperatures
Specific Gravity: Not Established

Section X. Stability And Reactivity

Stability: Stable
Hazardous Polymerization: Will Not occur
Incompatibilities: No specific incompatibility
Instable Conditions: Excessive temperatures (see Incompatibilities).
Decomposition Temperature: Decomposes ~300°C
Decomposition products: Thermal decomposition may produce carbon monoxide, ammonia, oxides of nitrogen, oxides of phosphorous and or hydrogen cyanide.

Section XI. Toxicological Infomation

RTECS Number: N/A
Routes of Exposure: Eye contact. Ingestion. Inhalation. Skin contact.
Toxicity Data: Oral LD50 (rats) >5000 mg/kg Dermal LD50 (rabbit) >2000 mg/kg
Chronic Toxic Effects: This product has no known chronic effects. Repeated or prolong exposure to this compound is not known to aggravate medical conditions.
Acute Toxic Effects: Irritating to the skin and eyes on contact. Inhalation will cause irritation to the lungs and mucus membrane. Irritation to the eyes will cause watering and redness. Reddening, scaling, and itching are characteristics of skin inflammation. Follow safe industrial hygiene practices and always wear protective equipment when handling this compound.

Section XII. Ecological Information

Ecotoxicity: Not available at this time.

Section XIII. Disposal Considerations

Waste Disposal Method: Waste disposal should be in accordance with existing federal, state and local environmental regulations.

Section XIV. Transportation Information

Proper Shipping Name: Melamine Phosphate
UN Number: N/A
Class: N/A
P.G.: N/A
DOT Label: N/A

Section XV. Regulatory Information

OSHA Status: This product is hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1910.1200.
TSCA Chemical Inventory: This compound is on the EPA Toxic Substance Control Act (TSCA) inventory List
California Proposition 65: To the best of our knowledge, this product contains no levels of listed substances, which the state of California has found to cause cancer, birth defects or other reproductive effects.
SARA 313 Title III:
Section 302 ExtremelyHazardous Substances: None
Section 311/312 Hazardous Categories: None
Section 313 Toxic Chemicals: None

Section XVI. Other Information

Prepared By: Mark Dugan & Elizabeth Serago
Date: January 14, 2004
Reason For Issue: Updated Format

HOME --- DATA Sheet --- MSDS LIST

Material Safety Data Sheet

Triethanolamine

ACC# 23930

Section 1 - Chemical Product and Company Identification

MSDS Name: Triethanolamine
Catalog Numbers: S80233, NC9659879, NC9729593, NC9741247, T350-4, T350-500, T407-1, T407-4, T407-500, XXT407205L, XXT407205LI
Synonyms: TEA; 2,2',2''-Nitrilotriethanol; 2,2,2-Trihydroxytriethylamine; Trihydroxyethylamine; Triethanolamin; Tris(beta-hydroxyethyl)amine.
Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ ELINCS
102-71-6	Triethanolamine	100	203-049-8

Hazard Symbols: XI
Risk Phrases: 36/38

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: water-white liquid. May cause dermatitis. Air sensitive. Light sensitive. Hygroscopic (absorbs moisture from the air). **Warning!** May cause allergic skin reaction. Causes eye and skin irritation. May cause respiratory tract irritation.
Target Organs: Kidneys, liver.

Potential Health Effects
Eye: Contact produces irritation, tearing, and burning pain. May cause transient corneal injury.
Skin: May cause irritation with burning pain, itching and redness.
Ingestion: Causes gastrointestinal irritation with nausea, vomiting and diarrhea.
Inhalation: Inhalation of a mist of this material may cause respiratory tract irritation.
Chronic: May cause liver and kidney damage. Prolonged or repeated contact may cause skin necrosis and/or ulceration of the skin.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use process enclosure, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Triethanolamine	5 mg/m3 TWA	none listed	none listed

OSHA Vacated PELs: Triethanolamine: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant a respirator's use.

Section 9 - Physical and Chemical Properties

Physical State: Liquid
Appearance: water-white
Odor: ammonia-like - weak odor
pH: 10.5
Vapor Pressure: < .01 mm Hg @ 2
Vapor Density: 5.1
Evaporation Rate:<0.01
Viscosity: 590.5 CPS
Boiling Point: 335 deg C
Freezing/ Melting Point:22 deg C
Decomposition Temperature:Not available.
Solubility: Soluble in water.
Specific Gravity/ Density:1.126
Molecular Formula:(HOCH2CH2)3N
Molecular Weight:149.1099

Section 10 - Stability and Reactivity

Chemical Stability: Stable.
Conditions to Avoid: Incompatible materials, light, exposure to air, exposure to moist air or water.
Incompatibilities with Other Materials: Moisture, air.
Hazardous Decomposition Products: Carbon monoxide, carbon dioxide, nitrogen

oxides (NOx) and ammonia (NH3).
Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:
CAS# 102-71-6: KL9275000
LD50/LC50:
CAS# 102-71-6:
Draize test, rabbit, eye: 20 mg Severe;
Draize test, rabbit, eye: 10 mg Mild;
Draize test, rabbit, skin: 560 mg/24H Mild;
Oral, mouse: LD50 = 5846 mg/kg;
Oral, rabbit: LD50 = 2200 mg/kg;
Oral, rat: LD50 = 4920 uL/kg;
Skin, rabbit: LD50 = >20 mL/kg;
Skin, rat: LD50 = >16 mL/kg;<BR.

Carcinogenicity:
CAS# 102-71-6:
IARC: IARC Group 3 - not classifiable
Epidemiology: No information available.
Teratogenicity: TDLo(Oral, rat) = 96 gm/kg; Kidney, Ureter, Bladder - other changes
Reproductive Effects: No information available.
Neurotoxicity: No information available.
Mutagenicity: Cytogenetic analysis(Human Lymphocyte) = 100 umol/LSister chromatid exchange(Human Lymphocyte) = 1 mmol/L
Other Studies: Standard Draize Test(Eye, Rabbit) = 20 mg; Severe.Standard Draize Test(Skin,Rabbit) = 560 mg/24Hr.; Mild.

Section 12 - Ecological Information

Ecotoxicity: Fish: Goldfish: LC50 = 5000 mg/L; 24 Hr.; Unspecified No data available.
Environmental: If released to soil, triethanolamine is expected to biodegrade fairly rapidly following acclimation (half-life on the order of days to weeks). Residual triethanolamine may leach. Volatilization from soil is not expected to be an important fate process. If released to water, triethanolamine should biodegrade. Bioncentration in aquatic organisms. If released to water, triethanolamine should biodegrade.
Physical: Based on a vapor of 3.59X10-6 mm Hg at 25 deg C(3), triethanolamine is expected to exist partly in the vapor phase and partly adsorbed to particulates in the atmosphere.
Other: No information available.

Section 13 - Disposal Considerations